Notice of Allowability	Application No.	Applicant(s)	
	10/723,084	NARASIMHAN ET AL.	
	Examiner	Art Unit	
	Said Broome	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *4/10/06*.

2. ☒ The allowed claim(s) is/are *1-65*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

Response to Amendment

1. This office action is in response to an amendment filed on 4/10/2006.

2. Claims 1, 18, 29, 46, 57, 60 and 63 have been amended by the applicant.

3. Claims 2-17, 19-28, 30-45, 47-56, 58, 59, 61, 62, 64 and 65 are original.

Allowable Subject Matter

Claims 1-65 are allowed. The following is an examiner's statement of reasons for allowance:

The prior art, Evans (The Spherical Harmonics Discrete Ordinate Method for Three-Dimensional Atmospheric Radiative Transfer), George (US Patent 6,459,818), Anderson et al. (US Patent 5,884,226) and Mengüçet et al. (US Patent 6,721,051) do not teach all the limitations of claims 1-63.

Regarding claim 1, Evans teaches a method and system for indicating a property of a medium on page 440 second column 3rd paragraph lines 7-8 ("...remote sensing of cloud properties and inferred fluxes.") where it is described that the property of a medium is determined and contains a light source that is analyzed under atmospheric interference(p. 440 first column 2nd paragraph lines 7-9 "SHDOM is an algorithm and computer program used to model general three-dimensional atmospheric radiative transfer. Unpolarized monochromatic or broadband transfer may be computed with either or both solar and thermal radiation."). George teaches an image of the light source is acquired or captured in column 2 lines 14-19. However, none of the cited prior art teaches capturing the image of a light source encompassed in the medium, modeling multiple scattering of light form the light source in the medium using a

Radiative Transfer Equation for Spherical Media and determines the property of the medium using the Radiative Transfer Equation for Spherical Media.

Regarding claim 18, Evans teaches modeling the behavior of light from outside the medium using a radiative transfer equation for spherical media on page 440 second column paragraph 4 lines 39-58 ("Potential applications of SHDOM include ...Comparing 1D, 2D, and 3D approximations for inhomogeneous radiative transfer. Studying effects of cloud inhomogeneities on satellite remote sensing of cloud properties and inferred fluxes... Investigating whether 3D radiative transfer can cause real or apparent ''anomalous'' solar absorption in clouds...."). George teaches capturing an image of light sources in column 2 lines 31-35 ("The imager represents an image capturing unit having optics for capturing light having both the degraded image and the image of the point source..") and in column 7 lines 26-28 ("Although a single point source is described in system 10, multiple point sources may be included for different objects in different parts of the imaged scene."). George also teaches in column 3 lines 66-67 and column 4 lines 1-3, an input device comprised in the computer system 20 illustrated in Figure 1A, therefore it would have been obvious to enable the system to enable the alteration of the image of interest. However, none of the cited prior art teaches receiving an image containing a light source encompassed in the medium, modeling multiple scattering of light from the light source in the medium using a Radiative Transfer Equation for Spherical Media and determines the property of the medium using the Radiative Transfer Equation for Spherical Media.

Regarding claim 29, Evans teaches a method for indicating a property of a medium on page 440 second column 3rd paragraph lines 7-8 ("...remote sensing of cloud properties and

inferred fluxes.") where it is described that the property of a medium is determined. George teaches capturing an image of light sources in column 2 lines 31-35 ("The imager represents an image capturing unit having optics for capturing light having both the degraded image and the image of the point source...") and in column 7 lines 26-28 ("Although a single point source is described in system 10, multiple point sources may be included for different objects in different parts of the imaged scene."). However, none of the cited prior art teaches capturing an image containing a light source encompassed in the medium, modeling multiple scattering of light from the light source in the medium using a Radiative Transfer Equation for Spherical Media and determines the property of the medium using the Radiative Transfer Equation for Spherical Media.

Regarding claim 46, Evans teaches modeling the behavior of light from outside the medium using a radiative transfer equation for spherical media on page 440 second column paragraph 4 lines 39-58 ("Potential applications of SHDOM include ...Comparing 1D, 2D, and 3D approximations for inhomogeneous radiative transfer. Studying effects of cloud inhomogeneities on satellite remote sensing of cloud properties and inferred fluxes... Investigating whether 3D radiative transfer can cause real or apparent ''anomalous'' solar absorption in clouds...."). George teaches in column 3 lines 66-67 and column 4 lines 1-3, an input device comprised in the computer system 20 illustrated in Figure 1A, therefore it would have been obvious to enable the system to enable the alteration of the image of interest. However, none of the cited prior art teaches identifying an image containing a light source encompassed in the medium and altering the image based upon the model and modeling multiple

scattering of light from the light source in the medium using a Radiative Transfer Equation for Spherical Media.

Regarding claim 57, Evans teaches a method of monitoring weather conditions in an area because the modeling the effects of a light source in an atmospheric medium that would be found in nature is described on page 440 second column paragraph 4 lines 39-58, and the study of atmospheric mediums enable the analysis of weather conditions. Evans teaches modeling the behavior of light from outside the medium using a radiative transfer equation for spherical media on page 440 second column paragraph 4 lines 39-58 ("Potential applications of SHDOM include ...Comparing 1D, 2D, and 3D approximations for inhomogeneous radiative transfer. Studying effects of cloud inhomogeneities on satellite remote sensing of cloud properties and inferred fluxes... Investigating whether 3D radiative transfer can cause real or apparent ''anomalous'' solar absorption in clouds...."). George teaches capturing an image of each of the multiple light sources in column 2 lines 31-35 ("The imager represents an image capturing unit having optics for capturing light having both the degraded image and the image of the point source..") and in column 7 lines 26-28 ("Although a single point source is described in system 10, multiple point sources may be included for different objects in different parts of the imaged scene."), therefore the image acquisition device is aimed in the direction of the light source. However, none of the cited prior art teaches capturing images of multiple light sources encompassed in the area, modeling multiple scattering of light from the light source using a Radiative Transfer Equation for Spherical Media and determining at least one of the forward scattering parameter, the optical thickness, the visibility of area using the Radiative Transfer Equation for Sphercal Media.

Regarding claim 60, Evans teaches a method of monitoring weather conditions in an area because the modeling the scattering of light from a light source in an atmospheric medium that would be found in nature is described on page 440 second column paragraph 4 lines 39-58, and the study of atmospheric mediums enable the analysis of weather conditions. Evans also teaches modeling the behavior of light from outside the medium using a radiative transfer equation for spherical media on page 440 second column paragraph 4 lines 39-58 ("Potential applications of SHDOM include ...Comparing 1D, 2D, and 3D approximations for inhomogeneous radiative transfer. Studying effects of cloud inhomogeneities on satellite remote sensing of cloud properties and inferred fluxes... Investigating whether 3D radiative transfer can cause real or apparent ''anomalous'' solar absorption in clouds...."). George teaches capturing an image of each of the multiple light sources in column 2 lines 31-35 ("The imager represents an image capturing unit having optics for capturing light having both the degraded image and the image of the point source..") and in column 7 lines 26-28 ("Although a single point source is described in system 10, multiple point sources may be included for different objects in different parts of the imaged scene."), therefore one of ordinary skill in the art would have been capable of using more than one image acquisition device aimed in the direction of the multiple light sources. However, none of the cited prior art teaches capturing images of a first and second light source encompassed in the area, modeling multiple scattering of light from each light source using a Radiative Transfer Equation for Spherical Media and determining at least one of the forward scattering parameter, the optical thickness, the visibility of area using the Radiative Transfer Equation for Sphercal Media.

Regarding claim 63, Evans teaches a method of monitoring weather conditions in an area because the modeling a light source in an atmospheric medium that would be found in nature is described on page 440 second column paragraph 4 lines 39-58, and the study of atmospheric mediums enable the analysis of weather conditions. Though Evans does not explicitly teach averaging different values of detected intensity of a glow of the light source along radial contours of the image, Evans does describe determining the radiative properties of the image under atmospheric inhomogeneities. Therefore it would have been obvious to one of ordinary skill in the art to provide the intensity of a glow in a radial contour, as illustrated in Figure 3, which would then be available for averaging as well. Evans also teaches modeling the behavior of light from outside the medium using a radiative transfer equation for spherical media on page 440 second column paragraph 4 lines 39-58 ("Potential applications of SHDOM include ...Comparing 1D, 2D, and 3D approximations for inhomogeneous radiative transfer. Studying effects of cloud inhomogeneities on satellite remote sensing of cloud properties and inferred fluxes... Investigating whether 3D radiative transfer can cause real or apparent ''anomalous'' solar absorption in clouds...."). George teaches capturing an image of each of the multiple light sources in column 2 lines 31-35 ("The imager represents an image capturing unit having optics for capturing light having both the degraded image and the image of the point source..") and in column 7 lines 26-28 ("Although a single point source is described in system 10, multiple point sources may be included for different objects in different parts of the imaged scene."), therefore the image acquisition device is aimed in the direction of the light source. However, none of the cited prior art teaches capturing images of a light source encompassed in the area, modeling multiple scattering of light from the light source as captured in the averaged image using a

Radiative Transfer Equation for Spherical Media and determining at least one of the forward scattering parameter, the optical thickness, the visibility of area using the Radiative Transfer Equation for Sphercal Media.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Said Broome whose telephone number is (571)272-2931. The examiner can normally be reached on 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on (571)272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

S. Broome
6/19/06 SB

ULKA CHAUHAN
SUPERVISORY PATENT EXAMINER